



The Eurofighter Consortium's Development of the Typhoon Fighter Aircraft

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Prepared for:



Eurofighter Typhoon

An overview of Europe's largest collaborative defense program

1986

The program **formally began in 1986** – but it had a difficult (and complicated) start from the late-1970s

1997

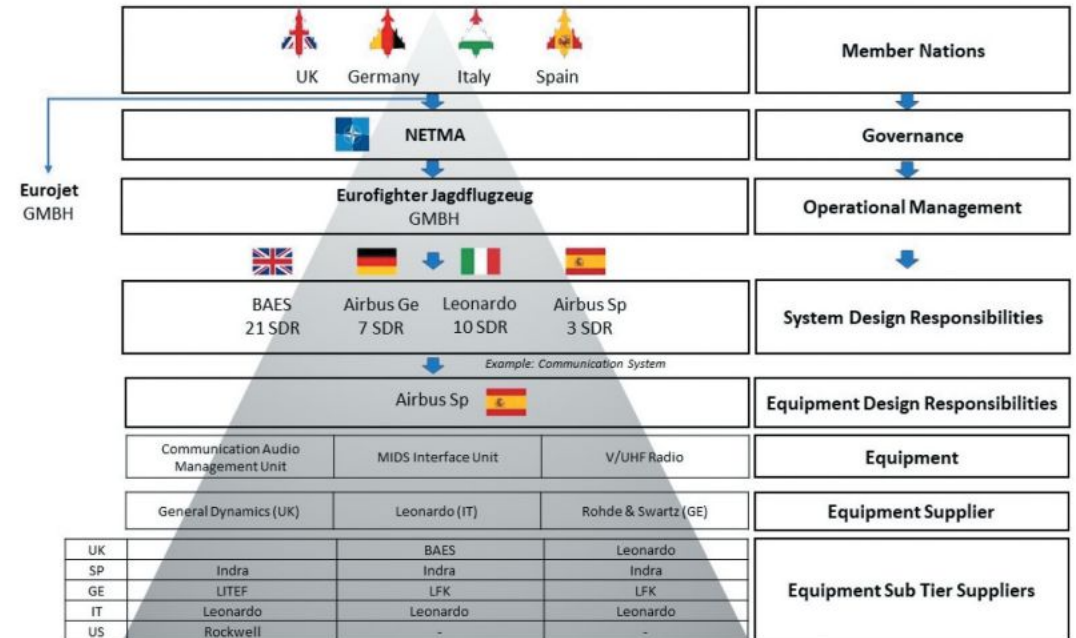
The core requirements for the aircraft were agreed in 1994 and the **production contract was signed in 1997**

2003

The first Eurofighter Typhoon **entered service in 2003** & Typhoon was first used in combat in 2011

682

A total of **682 aircraft have been ordered to date** – 531 for the partner nations & 151 for five export customers



Today's question: **“What does Eurofighter tell us about multi-national co-development?”**

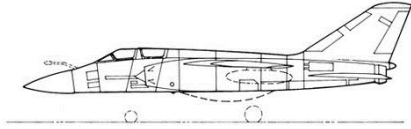
European Fighter Aircraft Co-Development

To understand Eurofighter, we must look to its predecessors

Eurofighter is the **fourth European fighter aircraft co-development program** since the early-1960s

- The **Anglo-French Variable Geometry (AFVG)** Aircraft was a **complete failure**
- The **Jaguar** ground-attack aircraft was successfully co-developed and manufactured by Britain's BAC and France's Breguet
 - But **the co-development failed** due to pressures from French industry, competition from Dassault's Mirage F1, and industrial consolidation
- The three-nation **Tornado** program sought to **address the basic co-development issues** that had undermined AFVG and Jaguar
 - The structure of the Tornado program solved some issues – but also introduced new ones...
- The **Eurofighter** Consortium **subsequently replicated Tornado's structure**, taking on its lessons, benefits, and problems

APACHE 
independent eXperts



AFVG

Co-development: **Failure**



Jaguar

Co-development: **Mixed**



Tornado

Co-development:
(Broadly) Successful



The Principles of Co-Development

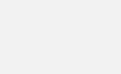

Britain joined Eurofighter. France did not. Italy, Germany and Spain followed Britain. Why?


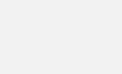



	<input type="checkbox"/>	Domestic Demand	Options: ? Co-develop ? Buy American
	<input type="checkbox"/>	Industry	
	<input type="checkbox"/>	Technology	

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	<input checked="" type="checkbox"/>	Industry	
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	<input type="checkbox"/>	Industry opposed co-development
	<input type="checkbox"/>	Lacked influence to change policy
	<input type="checkbox"/>	Government preference for Eurofighter co-development wins

	<input type="checkbox"/>	Industry opposed co-development
	<input type="checkbox"/>	Had influence through civil service
	<input type="checkbox"/>	Government policy changed to pursue a national program



	<input checked="" type="checkbox"/>	Increased export potential
	<input checked="" type="checkbox"/>	Secure leading European position
	<input checked="" type="checkbox"/>	Lower development costs
		<i>Alternative US buy = no gains</i>

	<input checked="" type="checkbox"/>	Boost domestic manufacturing
	<input checked="" type="checkbox"/>	Close gap to Britain & France
	<input checked="" type="checkbox"/>	Reduce dependency on US
		<i>French withdrawal = bigger gains!</i>

Theory vs Practice

Eurofighter shows that fighter aircraft co-development is inefficient – yet highly beneficial

Co-development should reduce the costs of a fighter aircraft program – **the reality is that it doesn't...**

Eurofighter tells us why... and shows that there are still many economic reasons to pursue co-development

In its efforts to mitigate the problems of fighter aircraft co-development **Eurofighter's structure created new problems and inefficiencies**

Workshare agreements & 'fair return'

Transaction costs of four nations

Duplication of production

Technology transfer issues

Greater formalization of rules

All add time & cost

For the partners the **benefits accumulated from Eurofighter have still been significant**

Over 100,000 Direct Jobs

Research & Development spillover

Export Revenues

European Technology Base

Alternative Supply & Options

Together highly beneficial

Learning from History

The Eurofighter program holds lessons for (Europe's) 6th-gen fighter aircraft co-development

The Eurofighter partners have formed **two different consortia to develop 6th-gen fighter aircraft**

Why two programs? Eurofighter co-development tells us why...

- **Industrial considerations** haven't changed
- **Relative gains** shape decision-making

Lessons for the Future

- **Program structures** have long-term effects
- **Efficiencies vs Benefits** trade-offs
- The operating **environment will change**
- The importance of **program flexibility**

New Co-Development & Manufacturing Challenges

- Not a single platform – **6th-gen fighters are part of a new combat air ecosystem**
- A major focus is on **software, open architectures** and the use of the digital space
- The role of **technology in manufacturing has changed** – new opportunities, new challenges





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